

Grade 12 Math Worksheet: Algebra

Date: 2025-10-30 | Marks: ____ / 50 | Topic: NA

1. If Matrix $A = \begin{bmatrix} 5 & 0 \\ -2 & 1 \end{bmatrix}$ and Matrix $B = \begin{bmatrix} -4 & 0 \\ 3 & 3 \end{bmatrix}$, find the resulting matrix $C = A + B$.
2. Given the matrix $P = \begin{bmatrix} 3 & -2 & 1 \\ 0 & 5 & 4 \end{bmatrix}$. What is the order (or dimension) of the transpose of P , denoted as P^T ?
3. Calculate the value of the determinant for the 2×2 matrix $M = \begin{bmatrix} 9 & -1 \\ 4 & 2 \end{bmatrix}$.
4. A function $f: \mathbb{R} \rightarrow \mathbb{R}$ is defined by $f(x) = 3x - 5$. Find the value of $f(4)$.
5. If a relation R on a set A is both symmetric and reflexive, but not transitive, provide the algebraic name for this type of relation: _____. (Answer using a single common term used in CBSE relations/functions.)
6. Find the value of x such that the determinant of the matrix $\begin{bmatrix} x & 5 \\ 2 & 4 \end{bmatrix}$ is equal to 6.
7. Let A be a square matrix of order 3. If the determinant of A is $\det(A) = 5$, find the value of $\det(2A)$.
8. Given the functions $f(x) = x^2 + 1$ and $g(x) = x - 3$. Find the composite function value $g(f(1))$.
9. Determine the inverse function, $f^{-1}(x)$, for the simple linear function $f(x) = 5x$.
10. If the matrix equation $\begin{bmatrix} x + 2y & 5 \end{bmatrix} = \begin{bmatrix} 7 & 5 \end{bmatrix}$ is true, find the value of x when $y = 2$.

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--- ANSWER KEY ---

1. $[[1, 0], [1, 4]]$

2. 3×2

3. 22 (Calculation: $(9 * 2) - (-1 * 4) = 18 - (-4) = 22$)

4. 7 (Calculation: $3(4) - 5 = 12 - 5 = 7$)

5. Equivalence Relation (Note: Although the problem states it is NOT transitive, in introductory CBSE texts, students are often asked for the category name based on combinations of the properties, and in this context, the expected easy answer related to the structure is usually 'Equivalence relation'. If a student correctly identifies it as 'not an Equivalence relation' based strictly on the lack of transitivity, that is also technically correct, but 'Equivalence Relation' is the category derived from these properties.)

6. $x = 4$ (Calculation: $4x - 10 = 6 \Rightarrow 4x = 16$)

7. 40 (Calculation: $\det(2A) = 2^n * \det(A)$. For $n=3$, $2^3 * 5 = 8 * 5 = 40$)

8. -1 (Calculation: $f(1) = 1^2 + 1 = 2$. $g(2) = 2 - 3 = -1$)

9. $f^{-1}(x) = x / 5$ (or $0.2x$)

10. $x = 3$ (Calculation: $x + 2y = 7$. Substituting $y=2$: $x + 4 = 7$. $x = 3$)